REMARKS

Status Summary

In this Amendment, no claims are added and no claims are canceled. Therefore, upon entry of this Amendment, claims 1-31 and 36-44 will be pending.

In-Person Examiner Interview Summary

Applicants greatly appreciate the in-person interview with Examiners Pezzlo and Lee on August 16, 2004. In the interview, claims 1, 11, 15, and 21 were discussed. In particular, the claim elements of receiving call signaling messages received over different fixed-bandwidth SS7 signaling links, multiplexing the call signaling messages, and transmitting the call signaling messages over a variable-bandwidth IP signaling link were discussed. In addition, the claim element of receiving IP-encapsulated SS7 call signaling messages over the variable bandwidth signaling link and routing the IP encapsulated call signaling messages using an MTP level 3 routing function resident on the IP interface module was also discussed. In the interview, the Examiners suggested that Applicants amend the claims to clarify that SS7-to-IP conversion is performed in addition to the multiplexing. Applicants have made appropriate amendments to claims 1, 11, 15, and 21. For example, independent claim 1 has been amended to recite, "converting the call signaling messages to IP and transmitting the multiplexed, IP-converted call signaling messages to an IP-capable node." Similar amendments have been made to claims 11, 15, and 21. Accordingly, in light of the amendments above, the Examiner Interview, and the remarks below, it is respectfully submitted that claims 1, 11, 15, and 21 and their dependent claims are now in condition for allowance.

Claim 25 was also discussed in the Interview. In particular, Applicants indicated that claim 25 recites receiving SS7 signaling units over a fixed-bandwidth signaling link, filtering out predetermined types of the SS7 signaling units, passing other types of the SS7 signaling units, encapsulating the passed signaling units and IP datagrams, and forwarding the IP datagrams over the variable-bandwidth signaling link. Applicants also indicated that neither Curry nor Longfield discloses any type of filtering of signaling units. Accordingly, based on the Interview and the remarks presented below, Applicants respectfully submit that claim 25 and its dependent claims are also in condition for allowance.

Claim Rejections 35 U.S.C. § 103

Claims 1-31 and 36-44 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 5,923,659 to Curry et al. (hereinafter, "Curry") in view of U.S. Patent No. 5,898,667 to Longfield et al. (hereinafter, "Longfield"). This rejection is respectfully traversed.

Independent claims 1, 11, 15, and 21 recite methods and systems for interconnecting SS7 signaling points (SPs) using an edge device. These claims have each been amended to recite that the edge device includes a plurality of SS7 link interface modules for connecting to each of the plurality of SS7 signaling points using fixed bandwidth SS7 signaling links and an IP interface module for connecting to a variable bandwidth signaling link. The link interface modules include SS7 message transfer part (MTP) level 3 routing functions that forward call signaling messages received over the fixed-bandwidth signaling links to the IP interface module. The MTP

level 3 routing functions collectively perform a multiplexing function by sending messages from multiple link interface modules to a single IP interface module. The IP interface module transmits the multiplexed call signaling messages over a variable-bandwidth signaling link. For inbound messages, the MTP level 3 routing function on the IP interface module forwards SS7 call signaling messages extracted from IP datagrams received by the IP interface module to the SS7 link interface module using an MTP level three routing function on the IP interface module.

Support for the claim element indicating that the MTP routing functions on the link interface modules forward call signaling messages to the IP interface modules appears, for example on page 20 at lines 19-21 of the present specification. Support for the claim element of connecting the plurality of SS7 signaling points to the link interface modules through a plurality of fixed bandwidth signaling links is supported by Figures 3 and 4 of the specification where fixed-bandwidth signaling links **308**, **310**, and **312** connect to link interface modules **400** and **402** illustrated in Figure 4. Support for the claim element of an IP interface module is provided by Figure 4 where DCM **404** that connects the IP signaling link **316**. Support for the claim element that the IP interface module includes an MTP level three routing function that forwards incoming SS7 messages to the link interface module is illustrated, for example, by element **432** and the message flow illustrated in Figure 4.

Providing a method or a system where SS7 link interface modules of an edge device connect to signaling points using fixed-bandwidth signaling links and MTP3 routing functions on the link interface modules collectively multiplex these messages to be transmitted over a variable bandwidth signaling link reduces the need for long-haul,

fixed-bandwidth SS7 signaling links to connect every node to the network. In addition, locating an MTP level 3 routing function on the IP interface module is advantageous because this location allows the function to rapidly and efficiently distribute SS7 signaling messages arriving over a high-speed IP link to the appropriate outbound link interface module.

As a preliminary matter, Applicants note that the Examiner's rejection of the claims as unpatentable over Curry in view of Longfield requires a combination of STP **118** of Curry, Internet module **130** of Curry, STP **20** of Longfield, and other elements that are not present in the either reference. The justification for combining STP **20** of Longfield with STP **118** of Curry is "so that multiple connections could be connected to the STP. One would have been motivated to do this because more than one caller could then take advantage of sending signaling messages over the Internet." (See paragraph 5 of Official Action.) This line of reasoning is flawed because adding an additional caller would not require an additional signaling link to STP **118** of Curry. As is well known in the telecommunications industry, end offices terminate multiple subscriber lines. The addition of a caller would not require the addition of a signaling link to STP **118** of Curry because an additional caller would simply require a new line in the existing end office. In addition, even assuming that multiple signaling links would be required at the STP of Curry in order to add a new subscriber, the STP already has multiple signaling links. (See interface modules **81** in Figure 9 of Curry.) Thus, for these reasons a person of ordinary skill in the art would not have been motivated to combine STP **20** of Longfield with STP **118** of Curry.

In paragraph 6 of the Official Action, the Examiner states that it would be obvious to combine the server Internet module with the functions of the signal transfer point "because it would streamline the setup, thus making the system more compact and reduce the number of components needed to make the system." However, this reasoning ignores the fact that the primary focus of the disclosure of Longfield is to reduce the load on the central processor of the STP. (See column 2, lines 42-48 of Longfield.) Adding server Internet module functionality to the STP would further burden the STP. Thus, Longfield teaches away from the combination proposed by the Examiner. Accordingly, for this additional reason, a person of ordinary skill in the art would not be led to combine the disclosures of Curry and Longfield.

Even assuming that it would be obvious to combine the disclosures of Curry and Longfield, there is absolutely no teaching or suggestion in Curry or Longfield, when taken individually or when combined, of a method or a system for connecting plurality of SS7 link interface modules of an edge device to a plurality of signaling links using fixed bandwidth SS7 signaling links, multiplexing SS7 call signaling message received over the fixed-bandwidth signaling links using MTP level 3 routing functions on the link interface modules, forwarding the multiplexed messages over an IP signaling link, or forwarding incoming SS7 call signaling messages extracted from IP datagrams to the SS7 link interface modules using an MTP level 3 routing function on the IP interface module. As stated in Applicants' response to the previous Official Action, Curry fails to teach or suggest receiving signaling messages from a plurality of SS7 signaling points over a fixed-bandwidth signaling link and forwarding these messages from the edge device over a variable bandwidth signaling link. In Curry, the only messages

transmitted from the foreign to the local network are routing a single signaling message from a local network to a foreign network. For example, Curry states:

> SSP **104** recognizes the call as directed to another switching office, suspends the call, formulates an SS7 packet message, and sends the SS7 message to STP **118**. STP **118** analyzes the point code information in the packet and routes the packets according to the translation table stored within the STP. The translation table recognizes the foreign prefix as one requiring modified, channel handling and directs the packet to Internet module **130** for transmitted over an Internet route. (See column 21, lines 14-24 of Curry.)

From this passage, the combined functions of STP **118** and server Internet module **130** of Curry are to route a signaling message from a single end office SSP **104** to the foreign exchange. There is no reason that SSP **118** and/or server Internet module **130** would multiplex any messages received from multiple SS7 signaling points because the only messages that server Internet module **130** receives are those originating from SSP **118** that are destined for a foreign exchange. Accordingly, Curry fails to teach multiplexing messages received from multiple different SS7 signaling points as claimed.

Yet another element of the claims that is not present in Curry is that the multiplexing is performed using MTP level 3 routing functions located on the link interface modules. According to Curry, all routing performed by STP **118** is performed by packet switch fabric **83** illustrated in Figure 9 of Curry. (See column 18, lines 9-12 of Curry.) Thus, rather than disclosing a node with distributed routing, Curry teaches a centralized routing function.

Still another claim element that is absent from Curry is an IP interface module that includes an MTP level 3 routing function that distributes SS7 messages extracted

from IP datagrams received by the IP interface module to the SS7 link interface modules. As stated above, the routing architecture of the STP of <u>Curry</u> is centralized.

<u>Longfield</u> fails to teach the elements of claims 1, 11, 15, and 21 that are missing from <u>Curry</u>. That is, <u>Longfield</u> fails to teach multiplexing call signaling messages received from different SS7 link interface modules using MTP level 3 routing functions on the link interface modules, transmitting the messages over a variable bandwidth signaling link, or forwarding SS7 call signaling messages received by the IP link interface module to the SS7 link interface modules using an MTP level 3 routing function resident on the IP link interface module. As a preliminary matter, the only type of messages discussed in <u>Longfield</u> as being processed by STP **20** are network management messages, such as link management and subsystem management messages (See e.g., column 7, line 64 through column 8, line 2 of <u>Longfield</u>.) Thus, <u>Longfield</u> fails to teach or suggest a signal transfer point that multiplexes SS7 <u>call</u> <u>signaling</u> messages received from different SS7 signaling points over fixed-bandwidth signaling links.

The only mention of multiplexing in <u>Longfield</u> is as follows:

> STP **20** is a telecommunications switch that receives signals from other network elements, multiplexes and switches the signals appropriately, and then transmits the signals to other network elements. (See column 4, lines 5-9 of <u>Longfield</u>.)

This passage merely indicates that an STP can multiplex signals. There is absolutely no teaching or suggestion of multiplexing messages received from different SS7 signaling links using MTP level 3 routing functions resident on different SS7 link interface modules or sending such messages over a variable bandwidth link.

Longfield also fails to teach or suggest an IP link interface module with an MTP level 3 routing function resident thereon. All of the links connected to STP **20** of Longfield are disclosed as being SS7 signaling links. Thus, for all of these reasons, it is respectfully submitted that the rejection of claims 1, 11, 15, and 21 and their respective dependent claims as unpatentable over Curry in view of Longfield should be withdrawn.

Independent claim 25 recites a computer program product for filtering out predetermined SS7 signaling units received over a fixed-bandwidth signaling link and only transmitting certain signaling message units over a variable bandwidth signaling link. In one example disclosed in Applicants' specification, the edge device receives MSUs, LSSUs, and FISUs and only allows MSUs to pass. Providing such filtering functionality prevents the variable bandwidth signaling link from being overwhelmed with unnecessary link management messages.

As a preliminary matter, although Applicants note that although claim 25 is listed in paragraph 3 of the Official Action as being rejected based on Curry in view of Longfield, there is no mention of claim 25 anywhere else in the Official Action. In other words, the Official Action fails to indicate how the combination of Curry and Longfield renders obvious claim 25. Thus, for this reason alone, the rejection of claim 25 as unpatentable over Curry in view of Longfield should be withdrawn.

Regarding dependent claims 26, 27, and 28, the Official Action states:

> Regarding claims 26, 27, and 28, neither Curry nor Longfield et al. expressly disclose filtering out LSSUs and FISUs received over SS7 signaling links, but it would have been obvious to filter them. One would have been motivated to do this because sending them along TCP/IP links would be a waste of resources since they are only needed to determine the status of SS7 links. (See paragraph 19 of Official Action.)

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Nothing in <u>Longfield</u> or <u>Curry</u> teaches the desirability of performing such filtering. As discussed in Applicants' response to the previous Official Action, <u>Curry</u> is directed to sending an MSU over an IP link. <u>Longfield</u> is directed to decentralization of network management. In contrast, Applicants' disclosure on page 22 states:

> Since LSSUs and FISUs consume link bandwidth and may be only of interest to SS7 signaling points connected via SS7 signaling links, it may be desirable to filter LSSUs and FISUs from the SS7 message that are encapsulated in IP datagrams and forwarded over the variable bandwidth signaling link. (See page 22, lines 1-5 of the present specification.)

Since neither <u>Curry</u> nor <u>Longfield</u> teaches that it is desirable to perform such filtering and Applicants' disclosure does teach the desirability of performing such filtering, it is respectfully submitted that the Examiner's rejection is based on hindsight stemming from Applicants' disclosure rather than the prior art. In addition, the Examiner's reasoning fails to consider that the easiest solution for multiplexing the fixed-bandwidth data streams sent over the variable bandwidth link is simply to send everything over the variable bandwidth link. Filtering requires algorithms and processing time. It would not be obvious to implement such algorithms in a protocol converter, such as server internet module **130** of <u>Curry</u>. Accordingly, for these reasons, the rejection of claim 25 and its dependent claims should be withdrawn.

CONCLUSION

In light of the above amendments and remarks, it is respectfully submitted that the present application is now in proper condition for allowance, and such action is earnestly solicited.

If any small matter should remain outstanding after the Patent Examiner has had an opportunity to review the above Remarks, the Patent Examiner is respectfully requested to telephone the undersigned patent attorney in order to resolve these matters and avoid the issuance of another Official Action.

DEPOSIT ACCOUNT

The Commissioner is hereby authorized to charge any fees associated with the filing of this correspondence to Deposit Account No. **50-0426**.

Respectfully submitted,

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Enclosures